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FULBRIGHT & JAWORSKI, L.L.P. 600 CONGRESS AVENUE, SUITE 2400 AUSTIN, TX 78701			HWU, JUNE	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/692,762	ARMSTRONG ET AL.	
	Examiner	Art Unit	
	June Hwu	1661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 05 April 2007.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1,5-8,10-14,17-22,26,27,31-33,35-41,43-45,49-52 and 54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1,5-8,10-14,17-22,26,27,31-33,35-41,43-45,49-52 and 54 is/are rejected.
- 7) Claim(s) 1,8,11,12,14,18,20,28,31,36-39,44 and 50 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date, _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

1. The amendment dated April 5, 2007 is acknowledged and entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in the prior Office action.

Status of the Claims

3. Claims 2-4, 9, 15-16, 23-25, 28-30, 34, 42, 46-48, 53 and 55-58 are cancelled; claims 1, 5-8, 10-14, 17-22 26-27, 31-33, 35-41, 43-45, 49-52 and 54 will be examined on the merits.
4. The rejection of claim 8 under 35 U.S.C. 102(a) over Kumar et al (Plant Cell Report (Nov. 1998) 18: 59-63) is withdrawn because of Applicants' declaration under 37 C.F.R. 1.131 and Exhibit A disclosing the use of activated charcoal to induce embryogenesis from cotton callus tissue by the inventor occurred prior to November 1998.
5. The rejection of claim 1 under 35 U.S.C. 102(a) over Hirimburegama et al (Journal of the National Science Council of Sri Lanka, 22(4), 1994, pp.305-315) is withdrawn because of Applicants' arguments that Hirimburegama et al do not teach regenerable cell culture of *Gossypium hirsutum*.
6. The rejection of claims 8, 10 and 11 under 35 U.S.C. 102(b) over Davis et al (In Vitro, vol. 9, no. 5, 1974) is withdrawn because of Applicants' arguments that Davis et al do not teach regenerable cell culture of *Gossypium hirsutum*.
7. The rejection of claims 28-30 under 35 U.S.C. 102(b) over Firoozabady et al (Plant Molecular Biology 10: 105-116, 1987) is obviated by Applicants' cancellation of the claims.
8. The rejection of claims 36-37 under 35 U.S.C. 102(b) over Rangan (U.S. Patent No. 5,244,802) is withdrawn because of Applicants' arguments that the transgenic cotton callus culture does not contain amino acid hydrolysate.

Claim Objections

The disclosure is objected to because of the following informalities:

9. Claims 1, 11, 12, 14, 18, 20, 28, 31, 36, 37, 38, 39, 44, and 50 at line 2; claim 8 at line 3; and claims 39 and 50 at line 4 are objected to because the term "media" should be in the singular form.

Claim Rejections - 35 USC § 102

10. Claim 1 remains rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al (*In Vitro*, vol. 13, no. 5, 1977, pp. 329-334).

Applicants' arguments filed April 5, 2007 have been fully considered but they are not persuasive.

Applicants urge that Smith reference describes non-regenerable plant cells from *Gossypium arboreum*, a diploid and that regeneration of diploid *Gossypium* sp. is not enabled (response p. 7).

This is not found persuasive because Smith et al disclose that one plantlet regenerated from cotyledon callus (p. 332, right col., last paragraph).

Applicants urge that Sakhonokho et al (Appendix 2) state that diploid *Gossypium* sp. is not enabled (response p. 8).

This is not found persuasive because Smith et al disclose as stated above that one cotton plantlet regenerated and that the claim is drawn to any cotton species.

Applicants urge that the methods of cotton callus induction or cotton embryogenesis are distinct methods (response p. 8).

This is not found persuasive because Smith et al had shown that callus were able to proliferate under those condition and if results are promising then it would have been obvious to use that experiment for cotton embryogenesis.

Applicants urge that they could not find any data demonstrating cell growth under dark conditions in the Smith reference (response p. 9).

This is not found persuasive because on p. 333, left col., second full paragraph Smith et al state "Low-light conditions were better than dark conditions." Therefore, there was callus proliferation under dark conditions but not as much callus growth compared to low-light conditions.

Claim Rejections - 35 USC § 103

11. Claims 1, 5-6, 8, 10-12, 14, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Firoozabady et al (*In Vitro Cell. Dev. Biol.* 299:166-178, 1993) in view of Davis et al (*In Vitro* vol. 9, no. 6, 1974, pp. 395-398) and further in view of Chi et al (*Plant Cell Reports* (1990) 9: 195-198).

The claims are drawn to a method of culturing regenerable non-embryogenic cotton callus tissue derived from hypocotyls or cotyledon in medium containing antioxidant (ascorbic acid) and ethylene inhibitor (aminoethoxyvinylglycine (AVG)) under dark lighting conditions of 0 μ Einstens $m^{-2} sec^{-1}$.

Firoozabady et al (1993) teach that embryogenic cotton callus derived from cotyledon and hypocotyls tissues (p. 166, right col. last paragraph) were cultured in media under complete darkness (p. 169, right col. last paragraph) or under low light condition of 9 μ Einstens $m^{-2} sec^{-1}$ (p. 167, left col. 1st full paragraph). Firoozabady et al is silent to the result of embryogenic callus culture grown in complete darkness but does state that the embryogenic cultures were stable

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and somatic embryos were produced which eventually regenerated into plants (p. 171, right col. 1st full paragraph).

Firoozabady et al (1993) do not teach culturing regenerable non-embryogenic cotton callus tissue, wherein the medium contains ascorbic acid and AVG.

Davis et al teach a method of culturing cotton (*Gossypium hirsutum*) callus derived from leaf explant (p. 395, left col., 2nd paragraph) in medium containing 5 mg/l of ascorbic acid (p. 395, right col., lines 9-10). The cotton callus formed within 36 days when 5 mg of ascorbic acid was added to the LS medium (p. 396, right col. 1st full paragraph).

Applicants' arguments filed April 5, 2007 in response to the 103(a) rejection of claims 1, 5-6, 8, 10-12, 14, 17, and 18 over Smith et al in view of Davis et al and further in view of Chi et al have been fully considered to the extent they apply to this new rejection, but they are not persuasive.

Applicants urge that Davis et al do not relate to culturing regenerable cotton cells and teach of maintaining callus culture and not embryogenesis (response p. 12).

This is not found persuasive because Davis et al was combined to show that ascorbic acid might be added to enhance the growth of the callus tissue.

Chi et al teach that AVG enhanced shoot regeneration from cotyledons of *Brassica*, a dicot. Cotyledons and hypocotyls of *Brassica* were excised and cultured on medium containing 20 µM AVG (p. 195 right col. last paragraph to p. 196, left col., line 4 and Table 1). Chi et al noted that the cotyledons were more regenerative than hypocotyls (p. 196, right col. 1st full paragraph).

Applicants urge that Chi et al *Brassica* and cotton (*Malvaceae*) are not closely related (response p. 13).

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This is not found persuasive because Chi et al was combined to show that shoot regeneration was enhanced by the addition of AVG. Chi et al noted that there were evidence that show growth and differentiation of plant cells and tissues of monocots and dicots were affected by ethylene (p. 195, right col.).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method of culturing regenerable non-embryogenic cotton callus tissue under dark condition as taught by Firoozabady (1993), and to modify that method by the addition of ascorbic acid as taught by Davis and the addition of AVG as taught by Chi. One of ordinary skill in the art would have been motivated to combine Firoozabady (1993) and Davis because Davis had noted that cotton callus showed good growth when ascorbic acid was added to the medium (p. 397, left col., first paragraph). Moreover, one of ordinary skill in the art would have been motivated to combine Firoozabady (1993) in view of Davis and further in view of Chi because Chi taught that dicot plants were able to regenerate with the addition of AVG (p. 198, left col., 1st full paragraph). Moreover, one of ordinary skill in the art at the time the invention was made would use the method of culturing cotton tissue grown under dark lighting condition as taught by Firoozabady (1993) and to modify that method by the addition of ascorbic acid which showed good growth in cotton callus (p. 397, left col. 1st full paragraph) as taught by Davis and adding AVG which enhanced shoot regeneration as taught by Chi because it would improve the regeneration of cotton plants. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

12. Claims 7, 13, 19-22, 26-27, 45 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Firoozabady et al (1993) in view of Davis et al, and further in view of Chi et al

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as applied to claims 1, 5-6, 8, 10-12, 14, 17, and 18 above, and further in view of Gould (Plant Cell Reports (1991) 10:12-16).

The claims are drawn to culturing transformed regenerable non-embryogenic cotton callus tissue in medium containing antioxidant (ascorbic acid) and ethylene inhibitor (aminoethoxyvinylglycine (AVG)) under dark lighting conditions of 0 μ Einstens $m^{-2} sec^{-1}$ and wrapped with a sealing material.

The teachings of Firoozabady et al (1993) in view of Davis et al, and further in view of Chi et al are discussed above.

Firoozabady et al (1993) in view of Davis et al, and further in view of Chi et al do not teach the use of filter paper as a support matrix in culturing transgenic embryogenic cotton callus tissue.

Gould et al teach that *Gossypium* cultivar Coker 310 is regenerated by shoot apex for plant transformation (p. 16, left col. 3rd paragraph). Gould et al taught that the shoot apex culture was supplemented with citric acid or activated charcoal (p. 13, left col. last paragraph, p. 14 col. 4th paragraph and Table 2). Furthermore, the culture plates were sealed with PARAFILM (p. 13, left col. last paragraph).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the teachings of Firoozabady (1993) in view of Davis, and further in view of Chi as discussed above, and to modifying that method by applying the method of plant transformation as taught by Gould. One of ordinary skill in the art would have been motivated to do so given that plant transformation is a way of improving cotton germplasm. Moreover, one of ordinary skill in the art at the time the invention was made would use the method of culturing cotton callus tissue grown under dark lighting conditions and the addition of ascorbic acid and the addition of AVG as taught by Firoozabady (1993) in view of Davis, and further in view of Chi

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in culturing transgenic embryogenic cotton tissue because of Gould taught plant transformation through shoot meristem could prevent genotype restriction and chromosomal damage caused by cotton regeneration in tissue culture (Gould abstract) as an obvious decision choice to promote transformation of regenerable cotton tissue. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

13. Claims 31- 33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Firoozabady et al (1993) in view of Davis et al, and further in view of Chi et al as applied to claims 1, 5-6, 8, 10-12, 14, 17, and 18 above, and further in view of Firoozabady et al (Plant Molecular Biology 10: 105-116, 1987).

The claims are drawn to culturing transformed regenerable non-embryogenic cotton callus tissue in medium containing antioxidant (ascorbic acid) and ethylene inhibitor (aminoethoxyvinylglycine (AVG)) under dark lighting conditions of 0 μ Einstens m^{-2} sec $^{-1}$ and culturing the transgenic embryogenic cotton tissue on a support matrix such as filter paper.

The teachings of Firoozabady et al (1993) in view of Davis et al, and further in view of Chi et al are discussed above.

Firoozabady et al (1993) in view of Davis et al, and further in view of Chi et al do not teach that the support matrix is filter paper.

Firoozabady et al (1987) teach that cotyledon tissues may be placed on filter paper for transformation of callus tissue (p. 107, right col. 2nd paragraph).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the teachings of Firoozabady (1993) in view of Davis, in view of Chi et al and further in view of Gould as discussed above, and to modifying that method by using filter paper as the support matrix in plant transformation as taught by Firoozabady et al (1987).

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One of ordinary skill in the art would have been motivated to do so given that filter paper is another form of support matrix used by tissue culture. Moreover, one of ordinary skill in the art at the time the invention was made would use the method of culturing transgenic cotton callus tissue grown under dark lighting conditions and the addition of ascorbic acid and AVG as taught by Firoozabady (1993), in view of Davis, and further in view of Chi and to combine that method by using filter paper as the support matrix because Firoozabady (1987) states that the use of filter paper in transformation reduces bacterial over growth on plant tissue (p. 107, right col. 2nd paragraph). Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Applicants' arguments filed April 5, 2007 in response to the rejection of claims 7, 13, 19-22, 26-27, 31-33, and 35 over Smith et al in view of Davis et al, Chi et al and further in view of Firoozabady et al have been fully considered to the extent they apply to this new rejection but they are not persuasive.

Applicants urge that the teachings of Firoozabady et al (1987) do not cure the defect in cotton transformation (response p. 14).

This is not found persuasive because Firoozabady et al (1987) was combined to show that filter paper might be used for cotton transformation.

14. Claims 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gould et al in view of Rangan (U.S. Patent No. 5,244,802).

The claims are drawn to a method of culturing transgenic embryogenic cotton tissue in medium containing amino acid hydrolysate supplement.

The teachings of Gould et al are discussed above.

Gould et al do not teach the addition of amino acid hydrolysate, for example, casein hydrolysate.

Rangan teaches a method of cotton regeneration wherein the cotton cotyledons were cut into segments (col. 12, lines 5-6) and cultured in media until callus formed then the callus was transferred to a suspension medium for further regeneration (col. 13, lines 5-7). After three to four subcultures on Beasley & Ting medium containing 500 mg/l casein hydrolysate (amino acid hydrolysate), the embryogenic callus produced embryos (col. 13, lines 66-68). These embryos eventually developed into plants (col. 14, lines 1-3). The seedling explants can also be transformed (col. 10, line 36 and examples 9-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method of culturing transgenic embryogenic cotton tissue as taught by Gould and adding casein hydrolysate to the medium as taught by Rangan. One of ordinary skill in the art would have been motivated to combine the methods of Gould with the method of Rangan because casein hydrolysate may further develop the somatic embryos into plantlets (col. 9, lines 19-29 and col. 10, lines 25-31). Moreover, one of ordinary skill in the art at the time the invention was made would use the method of culturing transgenic cotton tissue and to modify that method by the addition amino acid hydrolysate to improved somatic embryos growth as taught by Rangan because of the importance of cotton. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

15. Claims 39-41, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Firoozabady et al (1993) in view of Davis et al, in view of Chi et al, in view of Firoozabady et al (1987) as applied to claims 31-35 above, and further in view of Rangan.

The claims are drawn to culturing non regenerable cotton callus tissue in medium comprising of antioxidant, ethylene inhibitor under dark light condition to produce embryogenic cotton tissue, and culturing the embryogenic cotton tissue in medium containing amino acid hydrolysate, wherein the medium contains a support matrix.

The teachings of Firoozabady et al (1993) in view of Davis et al, in view of Chi et al and in view of Firoozabady et al (1987) are discussed above.

Firoozabady et al (1993) in view of Davis et al, in view of Chi et al and in view of Firoozabady et al (1987) do not teach that amino acid hydrolysate is supplemented to the cotton tissue medium.

The teachings of Rangan are discussed above.

It would have been obvious to one of ordinary skill in the art to use the method of culturing regenerable non-embryogenic cotton callus tissue in medium containing antioxidant, ethylene inhibitor under dark lighting conditions and culturing the embryogenic cotton tissue in medium containing a support matrix as taught by Firoozabady et al (1993) in view of Davis et al, in view of Chi et al and further in view of Firoozabady et al (1987) and to modify that method by supplementing the culture medium with amino hydrolysate. One would have been motivated to do so, given that cotton is an important agriculture crop and the development of new varieties are essential. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

16. Claims 50-52 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Firoozabady et al (1993) in view of Davis et al, in view of Chi et al, in view of Firoozabady et al (1987), in view of Rangan as applied to claims 39-41, 43 and 44 above, and further in view of Gould.

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The claims are drawn to a method of culturing regenerable non-embryogenic cotton callus tissue in medium comprising of antioxidant, ethylene inhibitor under dark light condition to produce embryogenic cotton tissue, and culturing the embryogenic cotton tissue in medium containing amino acid hydrolysate and a support matrix wrapped with a sealing material under dark conditions or limited light conditions or green light.

The teachings of Firoozabady et al (1993) in view of Davis et al, in view of Chi et al, in view of Firoozabady et al (1987) and in view of Rangan are discussed above.

Firoozabady et al (1993) in view of Davis et al, in view of Chi et al, in view of Firoozabady et al (1987) and in view of Rangan do not teach that the cotton callus culture medium is wrapped with a sealing material.

The teachings of Gould are discussed above.

It would have been obvious to one of ordinary skill in the art to use the method of cotton plant regeneration as taught by Firoozabady et al (1993) in view of Davis et al, in view of Chi et al, in view of Firoozabady et al (1987) and in view of Rangan as stated above, and to modify that method by wrapping the cotton callus culture with a sealing material such as a laboratory film as taught by Gould given the advantage of reducing contamination in the medium. One would have been motivated to do so, given the high survival rate of growing cotton tissue cells sealed with sealing material. Moreover, one of ordinary skill in the art at the time the invention was made would use the method of culturing cotton callus tissue in medium grown under dark lighting conditions supplemented with antioxidant and ethylene inhibitor to produce embryogenic cotton tissue and culturing the embryogenic cotton tissue in media containing support matrix and amino acid hydrolysate as taught by Firoozabady et al (1993) in view of Davis et al, in view of Chi et al, in view of Firoozabady et al (1987) and in view of Rangan and to wrap the cotton tissue culture in a sealing material to prevent contamination as taught by Gould. Thus, the

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invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Applicants' arguments filed April 5, 2007 in response to the rejection of claims 50-25 and 54 over Smith et al, in view of Davis, Chi, Rangan and Firoozabady and further in view of Gould have been fully considered to the extent they apply to this new rejection, but they are not persuasive.

Applicants urge that the teachings of Davis does not relate to the culture of regenerable cotton cells (response p. 16).

This is not persuasive because Davis is combined with Firoozabady et al (1993) to show that antioxidant could be added to the cotton culture to produce regenerable cotton plants.

Applicants urge that the teachings of Chi do not relate to cotton cell line because it teaches the culture of *Brassica* plants (response p. 16).

This is not persuasive because Chi had noted as stated above that ethylene has a positive effect on monocot and dicot plants.

Applicants urge that the addition of Gould does not cure the defects of the method of culturing regenerable cotton callus tissue (response p. 16).

This is not found persuasive because Gould was combined with Firoozabady et al (1993) in view of Davis et al, in view of Chi et al, in view of Firoozabady et al (1987) and further in view of Rangan to show that sealing material could be used to prevent contamination of the tissue culture.

Conclusion

17. No claims are allowed.

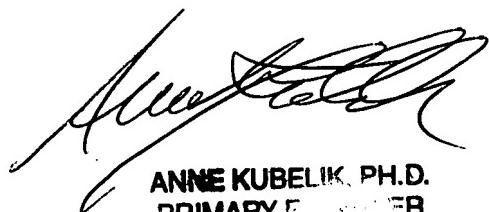
Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to June Hwu whose telephone number is (571) 272-0977. The Examiner can normally be reached Monday through Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anne Marie Grunberg, can be reached on (571) 272-0975. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JH



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PRIMARY EXAMINER